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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Application Number: 10/774,400
Filing Date: February 10, 2004
Appellant(s): LAGRANGE ET AL.

Chris Comuntzis
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed February 5, 2009 appealing from the Office action

mailed October 16, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

It is noted that an appeal brief has been filed in related application 10/774,399. Although this application is currently abandoned, a petition to revive has been filed.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct with the following changes:

NEW GROUND(S) OF REJECTION

Claim 10, 12-20, and 29-40 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

WITHDRAWN REJECTIONS

Appellant's argument on page 22, the last paragraph of Appellant's Appeal Brief, arguing that the term "fillets" in claim 12 is definite, has been carefully considered and is persuasive. Therefore, the rejection of claim 12 under 35 USC 112, second paragraph related to the term "fillets" is withdrawn.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

| 3,202,398 | WEBB | 8-1965 |
| 5,147,180 | JOHNSON | 9-1992 |

6,461,110	BY ET AL.	10-2002
677,142	UNITED KINGDOM	8-1952
6,030,178	CARUSO	2-2000
4,191,509	LEONARDI	3-1980
4,824,328	PISZ ET AL.	4-1989
5,176,500	HEINIG	1-1993
6,893,226	PHIPPS	5-2005

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

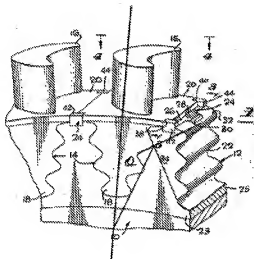#### *Claim Rejections - 35 USC § 112*

Claims 10, 12-20, and 29-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which appellant regards as the invention. Claim 10, lines 12-14 recite the straight surfaces of each of the two uppermost tangs on each side of a center line bisecting each of the buckets define two points of a respective line that form an angle of 20.782 degrees with the center line. This is inaccurate and should be amended to state that the straight surfaces of each of the two uppermost tangs on each side of a center line bisecting each of the buckets each respectively define a point of a line that forms an angle of 20.782 degrees with the center line, since each tang defines the point of the line. In claim 29, line 5, "said buckets" lacks antecedent basis. Claim 29, lines 9-11 recite the straight surfaces of each of the two uppermost tangs on each side of a center line bisecting each of the buckets define two points of a respective line that form an angle of 20.782

degrees with the center line. This is inaccurate and should be amended to state that the straight

surfaces of each of two uppermost tangs on each side of a center line bisecting each of the

buckets each respectively define a point of a line that forms an angle of 20.782 degrees with the

center line, since each tang defines the point of the line.

Claim Rejections - 35 USC § 102

Claims 29-32, as far as they are definite and understood, are rejected under 35

U.S.C. 102(b) as being anticipated by Webb 3,202,398. Note the buckets 16 for insertion into

wheelposts 34 of a turbine rotor 10, the buckets being formed from interleaved unnumbered

fillets and tangs which complement interleaved fillets and tangs (near 22) formed in the

wheelposts, the interleaved system of fillets and tangs on the buckets and wheelposts acting to

reduce stresses acting on the fitted buckets and wheelposts, the fillets and tangs of the interleaved

system each being formed by a combination of curved and straight surfaces, with the straight

surfaces of each of the two upper most tangs on each side of a center line bisecting each of the

buckets each respectively defining a point of a respective line that forms an angle of 20.782

degrees with the center line, and a point defined by intersecting tangent lines along pressure

faces of the bottommost tang does not lie on either line that forms the angle of 20.782 degrees

with the center line. The bucket has three interleaved tangs and fillets. The bucket has a bottom

tang 18 formed from curved surfaces having more than one radius of curvature. The bucket

further includes at least one straight surface (the leading and trailing edges). The line drawn

from the intersection of the straight surfaces of each of the two upper most tangs may be

selectively drawn such that it intersects the center line (at a portion of the center line remote from

the blade root) and forms the aforementioned 20.782 degree angle, such that this angle is the

same as Appellant's angle E of 20.782 degrees in figure 10, and a point defined by intersecting

tangent lines along pressure faces of the bottom most tang does not lie on either line that forms

the angle of 20.782 degrees with the center line, since the location where the drawn line that

forms the angle E intersects the center line is an arbitrary location. See the annotated figure

below.

Claims 29-32, as far as they are definite and understood, are also rejected under 35

U.S.C. 102(b) as being anticipated by Johnson 5,147,180. Note the buckets 12 for insertion into

unnumbered wheelposts of a turbine rotor 20, the buckets being formed from interleaved fillets

and tangs 22, 24, 26, 28, 30, 32 which complement unnumbered interleaved fillets and tangs

formed in the wheelposts, the interleaved system of fillets and tangs on the buckets and

wheelposts acting to reduce stresses acting on the fitted buckets and wheelposts, the fillets and

tangs of the interleaved system each being formed by a combination of curved and straight

surfaces, with the straight surfaces of each of the two upper most tangs on each side of a center

line bisecting each of the buckets each respectively defining a point of a respective line that

forms an angle of 20.782 degrees with the center line, and a point defined by intersecting tangent

lines along pressure faces of the bottommost tang does not lie on either line that forms the angle

of 20.782 degrees with the center line. The bucket has three interleaved tangs and fillets. The

bucket has a bottom tang 32 formed from curved surfaces having more than one radius of

curvature. The bucket further includes at least one straight surface 30a, 30b. The line drawn

from the intersection of the straight surfaces of each of the two upper most tangs may be

selectively drawn such that it intersects the center line (at a portion of the center line remote from

the blade root) and forms the aforementioned 20.782 degree angle, such that this angle is the

same as Appellant's angle E of 20.782 degrees in figure 10, and a point defined by intersecting

tangent lines along pressure faces of the bottom most tang does not lie on either line that forms

the angle of 20.782 degrees with the center line, since the location where the drawn line that

forms the angle E intersects the center line is an arbitrary location. See the annotated figure
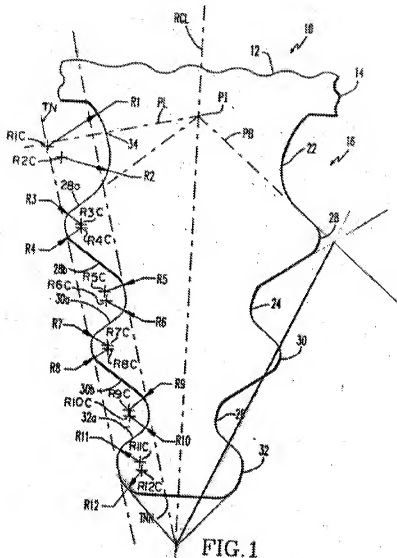
below.

FIG.1

Claim Rejections - 35 USC § 103

Claims 10 and 13-17, as far as they are definite and understood, are rejected under 35

U.S.C. 103(a) as being unpatentable over Webb 3,202,398 in view of By 6,461,110. Webb

discloses a turbine substantially as claimed, comprising a wheel 10 having plural broach slots 22,

each having an interleaved system of fillets and tangs, and plural buckets 16 each having a

corresponding interleaved system of fillets and tangs so that the plural buckets can be filled, one

to one, into the plural broach slots, with the interleaved system of fillets and tangs on the buckets

and wheelposts 34 inherently acting to reduce stresses acting on the fitted buckets and

wheelposts (due to the dovetail shape), the fillets and tangs of the interleaved system of fillets

and tangs each being formed by a combination of curved and straight surfaces. The straight

surfaces of each of the two uppermost tangs on each side of a center line bisecting each of the

buckets each respectively define a point of a respective line that forms an angle of 20.782

degrees with the center line, with a point defined by intersecting tangent lines along pressure

faces of the bottommost tang not lying on either line that forms the angle of 20.782 degrees with

the center line. The buckets and wheelposts have three interleaved tangs and fillets. Each of the

buckets has a bottommost tang 18 formed from unnumbered curved surfaces having more than

one radius of curvature (at the bottom of the tang and the top of the tang). Each bucket has

straight surfaces (the leading and trailing edges). Each of the wheelposts has an unnumbered

bottom fillet formed from curved surfaces having more than one radius of curvature (at the

bottom and at the top). Each wheelpost includes unnumbered straight surfaces. The line drawn

from the intersection of the straight surfaces of each of the two upper most tangs may be

selectively drawn such that it intersects the center line (at a portion of the center line remote from

the blade root) and forms the aforementioned 20.782 degree angle, such that this angle is the

same as Appellant's angle E of 20.782 degrees in figure 10, and a point defined by intersecting

tangent lines along pressure faces of the bottom most tang does not lie on either line that forms

the angle of 20.782 degrees with the center line, since the location where the drawn line that

forms the angle E intersects the center line is an arbitrary location. See the annotated figure

below.

However, Webb does not disclose that the turbine is formed such that first and second

stages each have a wheel having sixty broach slots (claim 10).

By (figures 1 and 8) shows a turbine near 40, having plural stages having a first stage

wheel 44 and a second stage wheel 42, with the number of buckets on the first stage wheel being

sixty, for the purpose of providing a turbine of providing a gas turbine engine of acceptable

efficiency with acceptable loads on the first stage wheel.

It would have been obvious at the time the invention was made to a person having

ordinary skill in the art to form the turbine of Webb such that a first stage wheel has sixty broach

slots, as taught by By. It would have been obvious at the time the invention was made to a

person having ordinary skill in the art to form the turbine of Webb such that it includes a second

stage wheel having sixty broach slots, as a mere duplication of the arrangement of the first stage,

because one of ordinary skill in the art would have recognized that the number of broach slots

disclosed by By would also be applicable to the second stage wheel, for the purpose of also

providing a gas turbine engine of acceptable efficiency with acceptable loads on the second stage

wheel.

Claim 12, as far as it is definite and understood, is rejected under 35 U.S.C. 103(a) as

being unpatentable over Webb 3,202,398 and By 6,461,110 as applied to claim 10 above, and

further in view of United Kingdom Patent 677,142. The modified turbine of Webb shows all of

the claimed subject matter except for the bucket tangs having an angle of 55 degrees.

United Kingdom Patent 677,142 shows a turbine having a rotor with unnumbered buckets

having tangs 3 which are formed at an angle of 55 degrees, for the purpose of providing more

favorable stress conditions in the turbine buckets and rotor.

It would have been further obvious at the time the invention was made to a person having

ordinary skill in the art to form the modified turbine of Webb such that the bucket tangs have

angles of 55 degrees, as taught by United Kingdom Patent 677,142, for the purpose of providing

more favorable stress conditions in the turbine buckets and rotor.

Claims 18-19, as far as they are definite and understood, are rejected under 35 U.S.C.

103(a) as being unpatentable over Webb 3,202,398 and By 6,461,110 as applied to claims 14 and

16, respectively above. The modified turbine of Webb show all of the claimed subject matter

except for the curved surfaces of the bucket bottom tang having radii of curvatures of .3762

inches and .5556 inches (claim 18), and except for the wheelpost bottom fillet having radii of

curvatures of .3822 inches and 0.5616 inches (claim 19).

The recitation of the curved surfaces of the bucket bottom tang having radii of curvatures of .3762 inches and .5556 inches, and the recitation of the wheelpost bottom fillet having radii of curvatures of .3822 inches and 0.5616 inches are deemed to be matters of choice in design. The radii of curvature of curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet are known in the art to be result-effective variables which, when optimized, reduce the stresses in the blade roots and the grooves. It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to select the radii of curvature in the modified turbine of Webb such that the radii of curvature of the curved surfaces of the bucket bottom tang and of the wheelpost bottom fillet are specific values, such as .3762 inches and .5556 inches for the bucket bottom tang, and such as .3822 inches and 0.5616 inches for the wheelpost bottom fillet, for the purpose of reducing the stresses in the blade roots and the grooves, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 20, as far as it is definite and understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Webb 3,202,398 and By 6,461,110 as applied to claim 10 above, and further in view of Caruso 6,030,178. The modified turbine of Webb shows all of the claimed subject matter, including unnumbered wheelposts, but does not show that the outer tang edge of each wheelpost is scalloped so as to reduce the weight of the turbine wheel.

Caruso (figure 1) shows a turbine wheel 10 having wheelposts shown generally at 12, which are formed such that an unnumbered outer tang edge of each wheelpost is scalloped, for the inherent purpose of reducing weight of the turbine wheel.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified turbine of Webb such that the outer tang edge of each wheelpost is scalloped, as taught by Caruso, for the purpose of reducing weight of the turbine wheel.

Claim 33, as far as it is definite and understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Webb 3,202,398. Webb discloses a turbine substantially as claimed as set forth above, including the bucket having a bottom tang 18 formed from curved surfaces having more than one radius of curvature.

However, Webb does not disclose the curved surfaces of the bucket bottom tang having radii of curvatures of .3762 inches and .5556 inches (claim 33).

The recitation of the curved surfaces of the bucket bottom tang having radii of curvatures of .3762 inches and .5556 inches is a matter of choice in design. The radii of curvature of curved surfaces of the bucket bottom tang are known in the art to be result-effective variables which, when optimized, reduce the stresses in the blade roots and the grooves. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to select

the radii of curvature of the curved surfaces of the bucket bottom tang and of the wheelpost

bottom fillet to be specific values, such as .3762 inches and .5556 inches for the bucket bottom

tang, for the purpose of reducing the stresses in the blade roots and the grooves, since it has been

held that discovering an optimum value of a result effective variable involves only routine skill

in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 34-40, as far as they are definite and understood, are rejected under 35 U.S.C.

103(a) as being unpatentable over Webb 3,202,398 in view of Leonardi 4,191,509. Webb

discloses a bucket substantially as claimed as set forth above, but does not disclose the upper

tang formed from curved surfaces with more than one radii of curvature (claims 34-35), and does

not show the intermediate tang 30 formed from curved surfaces with more than one radii of

curvature (claims 37-39).

Leonardi (figures 1-2 and 4) shows a bucket 18 having a root 16 with an upper tang 28

formed from curved surfaces with more than one radii of curvature R1, R2, and an intermediate

tang 28 having more than one radius of curvature R1, R2, for the purpose of improving low cycle

fatigue, and reducing combined bending and shear stress.

It would have been obvious at the time the invention was made to a person having

ordinary skill in the art to form the bucket of Webb such that the upper tang is formed from

curved surfaces with more than one radii of curvature, and intermediate tang is formed from

curved surfaces with more than one radii of curvature, as taught by Leonardi, for the purpose of

improving low cycle fatigue, and reducing combined bending and shear stress.

Claims 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pisz

4,824,328 in view of By 6,461,110. Pisz (figures 1-6 and Table 7) discloses a turbine

substantially as claimed, comprising a wheel 21 having broach slots 19, each having an

interleaved system of fillets and tangs, and a plurality of buckets 15 each having a corresponding

interleaved system of fillets and tangs so that the plurality of buckets can be fitted, one to one,

into the broach slots on the wheel, wherein the interleaved system of fillets and tangs on the

buckets and broach slots act to reduce stresses acting on the fitted buckets and broach slots, the

fillets and tangs of the interleaved system of fillets and tangs each being formed by a

combination of curved and straight surfaces, wherein above the uppermost tang on each of the

buckets there is a compound fillet having a first radius of curvature R1 of 0.3128 inches and a

second radius of curvature R2 having 0.0873 inches. Below the upper most tang on each of the

buckets there is a fillet having a radius of curvature R5 of 0.0477 inches. Above the bottom most

tang on each of the buckets there is a fillet having a radius of curvature R10 of 0.0477 inches.

However, Pisz does not disclose that the turbine has multiple stages (claim 41), does not

disclose that that first and second stages have the above fillet and tang configurations (claim 41),

does not disclose sixty broach slots that receive sixty buckets (claim 41), does not disclose that

above the uppermost tang on each of the buckets the compound fillet has a first radius of

curvature of 0.3342 inches and a second radius curvature of 0.0983 inches (claim 41), does not

disclose that below the upper most tang on each of the buckets the fillet has a radius of curvature

of 0.0741 inches (claim 42), and does not disclose that above the bottom most tang on each of

the buckets the fillet has a radius of curvature of 0.0897 inches (claim 43).

By (figures 1 and 8) shows a turbine near 40, having plural stages having a first stage

wheel 44 and a second stage wheel 42, with the number of buckets on the first stage wheel being

sixty, for the purpose of providing a turbine of providing a gas turbine engine of acceptable

efficiency with acceptable loads on the first stage wheel.

It would have been obvious at the time the invention was made to a person having

ordinary skill in the art to form the turbine of Pisz to include multiple stages and such that a first

stage wheel has sixty broach slots, as taught by By. It would have been obvious at the time the

invention was made to a person having ordinary skill in the art to form the turbine of the Pisz

such that it includes a second stage wheel having sixty broach slots, as a mere duplication of the

arrangement of the first stage, because one of ordinary skill in the art would have recognized that

the number of broach slots disclosed by By would also be applicable to the second stage wheel,

for the purpose of also providing a gas turbine engine of acceptable efficiency with acceptable

loads on the second stage wheel.

The recitation of the uppermost tang on each of the buckets the compound fillet having a

first radius of curvature of 0.3342 inches and a second radius curvature of 0.0983 inches, the

recitation that below the upper most tang on each of the buckets the fillet has a radius of

curvature of 0.0741 inches, and the recitation that above the bottom most tang on each of the

buckets the fillet has a radius of curvature of 0.0897 inches, are deemed to be matters of choice

in design. The radii of curvature of the bucket tangs are recognized by Pisz to be result-effective

variables which, when optimized, reduce the stresses in the blade roots and the grooves. It

would have been further obvious at the time the invention was made to a person having ordinary

skill in the art to select the radii of curvature of the bucket tangs to be specific values, such as the

uppermost tang on each of the buckets having the compound fillet with a first radius of curvature

of 0.3342 inches and a second radius curvature of 0.0983 inches, such as below the upper most

tang on each of the buckets the fillet having a radius of curvature of 0.0741 inches, and such as

above the bottom most tang on each of the buckets the fillet having a radius of curvature of

0.08975 inches, for the purpose of reducing the stresses in the blade roots and the grooves, since

it has been held that discovering an optimum value of a result effective variable involves only

routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

        Claims 44-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heinig

5,176,500 in view of By 6,461,110. Heinig discloses a turbine substantially as claimed,

comprising a wheel 18 having broach slots 16, each having an interleaved system of fillets and

tangs, and a plurality of buckets 9 each having a corresponding interleaved system of fillets and

tangs so that the plurality of buckets can be fitted, one to one, into the broach slots on the wheel,

wherein the interleaved system of fillets and tangs on the buckets and broach slots act to reduce

stresses acting on the fitted buckets and broach slots, the fillets and tangs of the interleaved

system of fillets and tangs each being formed by a combination of curved and straight surfaces,

wherein for each one of the plurality of buckets the distance from the bottom of the bottom most tang to the upper most straight portion of the upper most fillet is 0.9480 inches (figure 4). For each one of the plurality of buckets, the distance from the bottom of the bottom most tang to a first intersection point of tangent lines drawn along pressure faces of the tang adjacent to the bottom most tang appears to be greater than 60 percent of the distance 0.9480 inches.

However, Heinig does not disclose that the turbine has multiple stages (claim 44), does not disclose that that first and second stages have the above fillet and tang configurations (claim 44), does not disclose sixty broach slots that receive sixty buckets (claim 44), does not disclose that for each one of the plurality of buckets the distance from the bottom of the bottom most tang to the upper most straight portion of the upper most fillet is 1.9836 inches (claim 44), and does not disclose that for each one of the plurality of buckets the distance from the bottom of the bottom most tang to a first intersection point of tangent lines drawn along pressure faces of the tang adjacent to the bottom most tang is 0.8429 inches (claim 45).

By (figures 1 and 8) shows a turbine near 40, having plural stages having a first stage wheel 44 and a second stage wheel 42, with the number of buckets on the first stage wheel being sixty, for the purpose of providing a turbine of providing a gas turbine engine of acceptable efficiency with acceptable loads on the first stage wheel.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of Heinig to include multiple stages and such that a

first stage wheel has sixty broach slots, as taught by By. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of the Heinig such that it includes a second stage wheel having sixty broach slots, as a mere duplication of the arrangement of the first stage, because one of ordinary skill in the art would have recognized that the number of broach slots disclosed by By would also be applicable to the second stage wheel, for the purpose of also providing a gas turbine engine of acceptable efficiency with acceptable loads on the second stage wheel.

The recitation of the distance from the bottom of the bottom most tang to the upper most straight portion of the upper most fillet being 1.9836 inches, and the recitation of the distance from the bottom of the bottom most tang to a first intersection point of tangent lines drawn along pressure faces of the tang adjacent to the bottom most tang being 0.8429 inches are matters of choice design. These dimensions are recognized by Heinig to be result-effective variables which when optimized, reduce the stresses in the blade roots and the grooves. It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to select the distance from the bottom of the bottom most tang to the upper most straight portion of the upper most fillet to be a specific value, such as 1.9836 inches, and to select the distance from the bottom of the bottom most tang to a first intersection point of tangent lines drawn along pressure faces of the tang adjacent to the bottom most tang to be 0.8429 inches, for the purpose of reducing the stresses in the blade roots and the grooves, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 48 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heinig

5,176,500 and By 6,461,110 as applied to claims 44 and 45, respectively above, and further in

view of Phipps 6,893,226. The modified turbine of Heinig shows all of the claimed subject

matter except for the angle between the upper most straight portion of the upper most fillet and

the upper most straight portion of the upper most tang being 50 degrees.

Phipps shows a turbine blade 30 having an angle between an upper most straight portion

of an upper most fillet 52 and an upper most straight portion of an upper most tang being 55

degrees, for the purpose of allowing the blade to withstand centrifugal loading when in

operation.

It would have been further obvious at the time the invention was made to a person having

ordinary skill in the art to form the modified turbine of Heinig such that the angle between the

upper most straight portion of the upper most fillet and the upper most straight portion of the

upper most tang is 55 degrees. The specific recitation of this angle being 50 degrees is a matter

of choice in design. This angle is known to be a result-effective variable which adjusts the stress

distribution in the blade roots. It would have been further obvious at the time the invention was

made to a person having ordinary skill in the art to form the modified turbine of Heinig such that

this specific angle is 50 degrees, for the purpose of optimizing the stress distribution in the blade

roots, since it has been held that discovering an optimum value of a result effective variable

involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 52-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson

5,147,180 in view of By 6,461,110. Johnson discloses a multiple stage turbine substantially as

claimed, comprising a wheel 20 having unnumbered broach slots, each having an interleaved

system of fillets and tangs, and a plurality of buckets 10 each having a corresponding interleaved

system of fillets and tangs so that the plurality of buckets can be fitted, one to one, into the

broach slots on the wheel, wherein the interleaved system of fillets and tangs on the buckets and

broach slots act to reduce stresses acting on the fitted buckets and broach slots, the fillets and

tangs of the interleaved system of fillets and tangs each being formed by a combination of curved

and straight surfaces, wherein below the uppermost tang on each of the broach slots there is fillet

(corresponding to R3, R4) having a radius of curvature of about 0.0721 inches, and above a

bottom most tang on each of the broach slots there is a fillet (corresponding to R11) of about

0.0945 inches.

However, Johnson does not disclose that the first and second stages have the above fillet

and tang configurations (claim 52), does not disclose sixty broach slots that receive sixty buckets

(claim 52), does not disclose that below the uppermost tang on each of the broach slots the fillet

has a radius of curvature of 0.0959 inches (claim 52), and does not disclose that above the

bottom most tang on each of the broach slots the fillet has a radius of curvature of 0.1037 inches

(claim 53).

By (figures 1 and 8) shows a turbine near 40, having plural stages having a first stage wheel 44 and a second stage wheel 42, with the number of buckets on the first stage wheel being sixty, for the purpose of providing a turbine of providing a gas turbine engine of acceptable efficiency with acceptable loads on the first stage wheel.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of Johnson such that a first stage wheel has sixty broach slots, as taught by By. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of Johnson such that it includes a second stage wheel having sixty broach slots, as a mere duplication of the arrangement of the first stage, because one of ordinary skill in the art would have recognized that the number of broach slots disclosed by By would also be applicable to the second stage wheel, for the purpose of also providing a gas turbine engine of acceptable efficiency with acceptable loads on the second stage wheel.

The recitation that below the uppermost tang on each of the broach slots the fillet has a radius of curvature of 0.0959 inches, and that above the bottom most tang on each of the broach slots the fillet has a radius of curvature of 0.1037 inches, are matters of choice in design. Johnson recognizes that these are result-effective variables which, when optimized, reduce the stresses in the blade roots and the grooves. It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to select the radius of curvature of the uppermost tang on each of the broach slots of the fillet to have a specific radius of curvature,

such as 0.0959 inches, and to select the radius of curvature above the bottom most tang on each

of the broach slots of the fillet to have a specific radius of curvature, such as of 0.1037 inches,

for the purpose of reducing the stresses in the blade roots and the grooves, since it has been held

that discovering an optimum value of a result effective variable involves only routine skill in the

art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 55-56 and 59-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Heinig 5,176,500 in view of By 6,461,110. Heinig discloses a turbine substantially as claimed,

comprising a wheel 18 having unnumbered broach slots, each having an interleaved system of

fillets and tangs, and a plurality of buckets 9 each having a corresponding interleaved system of

fillets and tangs so that the plurality of buckets can be fitted, one to one, into the broach slots on

the wheel, wherein the interleaved system of fillets and tangs on the buckets and broach slots act

to reduce stresses acting on the fitted buckets and broach slots, the fillets and tangs of the

interleaved system of fillets and tangs each being formed by a combination of curved and

straight surfaces, wherein for each one of the broach slots the distance from the bottom of the

bottom most fillet to the upper most straight portion of the upper most tang is 0.9500 inches

(figure 3). For each one of the plurality of broach slots, the distance from the bottom of the

bottom most fillet to a first intersection point of tangent lines drawn along pressure faces of the

fillet adjacent to the bottom most fillet appears to be greater than 60 percent of the distance

0.9500 inches.

However, Heinig does not disclose that the turbine has multiple stages (claim 55), does

not disclose that that the first and second stage has the above fillet and tang configurations (claim

55), does not disclose sixty broach slots that receive sixty buckets (claim 55), does not disclose

that for each one of the broach slots the distance from the bottom of the bottom most fillet to the

upper most straight portion of the upper most tang is 1.9836 inches (claim 55), does not disclose

that for each one of the plurality of broach slots, the distance from the bottom of the bottom most

fillet to a first intersection point of tangent lines drawn along pressure faces of the fillet adjacent

to the bottom most fillet is 0.8433 inches (claim 56), and does not disclose that for each one of

the broach slots the angle between the upper most straight portion of the upper most tang and the

upper most straight portion of the upper most fillet is 50 degrees (claims 59 and 60).

By (figures 1 and 8) shows a turbine near 40, having plural stages having a first stage

wheel 44 and a second stage wheel 42, with the number of buckets on the first stage wheel being

sixty, for the purpose of providing a turbine of providing a gas turbine engine of acceptable

efficiency with acceptable loads on the first stage wheel.

It would have been obvious at the time the invention was made to a person having

ordinary skill in the art to form the turbine of Heinig to include multiple stages and such that a

first stage wheel has sixty broach slots, as taught by By. It would have been obvious at the time

the invention was made to a person having ordinary skill in the art to form the turbine of Heinig

such that it includes a second stage wheel having sixty broach slots, as a mere duplication of the

arrangement of the first stage, because one of ordinary skill in the art would have recognized that

the number of broach slots disclosed by By would also be applicable to the second stage wheel,
for the purpose of also providing a gas turbine engine of acceptable efficiency with acceptable
loads on the second stage wheel.

The recitation of the distance from the bottom of the bottom most fillet to the upper most
straight portion of the upper most tang being 1.9836 inches, the recitation of the distance from
the bottom of the bottom most fillet to a first intersection point of tangent lines drawn along
pressure faces of the fillet adjacent to the bottom most fillet being 0.8433 inches, and the
recitation of the angle between the upper most straight portion of the upper most tang and the
upper most straight portion of the upper most fillet being 50 degrees, are matters of choice
design. These lengths and this angle are recognized by Heinig and in the art to be result-
effective variables which when optimized, reduce the stresses in the blade roots and the grooves.
It would have been further obvious at the time the invention was made to a person having
ordinary skill in the art to select the distance from the bottom of the bottom most fillet to the
upper most straight portion of the upper most tang to be a specific value, such as 1.9836 inches,
to select the distance from the bottom of the bottom most fillet to a first intersection point of
tangent lines drawn along pressure faces of the fillet adjacent to the bottom most fillet to be
0.8433 inches, and to select the angle between the upper most straight portion of the upper most
tang and the upper most straight portion of the upper most fillet to be 50 degrees, for the purpose
of reducing the stresses in the blade roots and the grooves, since it has been held that discovering
an optimum value of a result effective variable involves only routine skill in the art. *In re
Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

NEW GROUND OF REJECTION

Claim 10, 12-20, and 29-40 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 10 and 29 were amended in the amendments of February 26, 2007 and August 15, 2007. Claims 10 and 29 now recite that "wherein the straight surfaces of each of the two uppermost tangs on each side of a center line bisecting each of said buckets define two points of a respective line that form an angle of 20.782° with the center line" (claim 10, lines 12-14 and claim 29, lines 8-10; see the Claims Appendix of the Appeal Brief). However, the original specification at paragraph [0048], lines 16-20 states "In FIGURE 10 angles D and E are measured from center line C to lines defined by points at which tangent lines along the first and second fillets intersect. Angles D and E are respectively 21.000° and 20.782°." The amended claim language is broader than the original disclosure, since it does not limit the definition of the two points to the location at which the straight surfaces intersect, which is what the specification and figure 10 disclose. Therefore, the amended claim language is broader than the originally filed disclosure, i.e. figure 10.

   (10) Response to Argument

Concerning argument A, which is whether claims 10, 12-20, and 29-40 are properly rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which appellant regards as the invention,

Appellant has argued that the examiner misinterprets claims 10 and 29 and implies that

Appellant's requirement that "the straight surfaces of each of the two uppermost tangs on each

side of a centerline bisecting each of the buckets" means that only the uppermost tang on each

side of the bucket, for example tang 22 in Appellant's Figure 10 is utilized to "define a point of a

line that forms an angle of 20.782 degrees". Appellant has further argued that the examiner has

misconstrued the claim language that requires the use of two tangs on each side of the bucket to

define the line that forms angle E with the center line, and that the examiner's interpretation of

the claim is erroneous because a line cannot properly be defined by a single point, and that by

doing so, leads to the annotated figure 1 of the Office action where it is possible to draw a line

through the tangent lines of a single tang such as tang 28 at any angle. Appellant has further

argued that as shown in annotated Figure 1 the line drawn by the Examiner is not defined by

tangent lines drawn using the two uppermost tangs 28 and 30 to define two points for defining

the line, but by only using the single uppermost tang 28.

These arguments are respectfully disagreed with, because Appellant is attempting to

import limitations from the specification which are not recited in the claims in order to rebut the

indefiniteness rejection. Although the claims are interpreted in light of the specification,

limitations from the specification are not read into the claims. See *In re Van Geuns*, 988

F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Appellant's figure 10 of August 15, 2007 shows

angle E which is formed by two points derived from tangs 22, 23 that are connected by a line

intersecting the centerline C, but the claim language of claims 10 and 29 does not recite this.

Claims 10 and 29 recite that "wherein the straight surfaces of each of the two uppermost tangs on

each side of a center line bisecting each of said buckets define two points of a respective line that

form an angle of 20.782° with the center line" (claim 10, lines 12-14 and claim 29, lines 8-10;

see the Claims Appendix of the Appeal Brief). This amended claim language does not limit the

definition of the two points to the location at which the straight surfaces intersect, which is what

the specification and figure 10 disclose. As is literally written in Appellant's claims 10 and 29,

the straight surfaces of each of the two uppermost tangs on each side of a center line bisecting

each of the buckets define two points of a respective line that form an angle of 20.782 degrees

with the center line. This is broader than the specification embodiment argued by the appellant

therefore the rejection has been maintained. It is noted that a 112, first paragraph rejection has

been made to reflect the fact that the specification does not support the present claim language.

        Concerning argument B1, which is whether claims 29-32 are anticipated under

U.S.C. 102(b) by Webb 3,202,398, Appellant has argued that the examiner has erroneously used

a single upper tang (one on each side of the bucket) to determine a single point used to define a

line forming an angle of 20.782° with the center line of the bucket, and that if the two uppermost

tangs of Webb are used, as required by the claim language, to define the line then the angle

formed with the center line is less than 14° in Webb. Appellant also refers to created figure A of

Webb, drawn by Appellant, in Evidence Appendix IX. Appellant has also argued that the

examiner's actions are not in accordance with the claim language which requires using the two

uppermost tangs on each side of a centerline bisecting the bucket, thereby defining a single

specific line that formed an angle of 20.782° with the bucket center line.

        These arguments are respectfully disagreed with, because Webb 3,202,398 still discloses

the claimed subject matter. The straight surfaces of each of the two uppermost tangs on each

side of a center line bisecting each of the buckets each respectively define a point of a line that

forms an angle of 20.782 degrees with the center line on both of these references. The line

drawn from the intersection of the straight surfaces of each of the two upper most tangs may be

selectively drawn such that it intersects the center line (at a portion of the center line remote from

the blade root) and forms the aforementioned 20.782 degree angle, such that this angle is the

same as Appellant's angle E of 20.782 degrees in figure 10, and a point defined by intersecting

tangent lines along pressure faces of the bottom most tang does not lie on either line that forms

the angle of 20.782 degrees with the center line, since the location where the drawn line that

forms the angle E intersects the center line is an arbitrary location. See the annotated figure for

Webb provided previously above. Claims 10 and 29 do not limit the definition of the two points

to the location at which the straight surfaces intersect, which is what the specification and figure

10 disclose. Although the claims are interpreted in light of the specification, limitations from the

specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26

USPQ2d 1057 (Fed. Cir. 1993).

     With regard to Appellant's arguments that Webb utilizes key 24 or key 50 for locking

and retaining the turbine rotor blades on the turbine wheel, that Webb states that "[i]t is to be

understood that the particular slot and root form is immaterial.", and that Webb also does not

teach or suggest the limitation of claim 29 of "wherein said interleaved system of fillets and

tangs on said bucket and wheelpost act to reduce stresses acting along on said fitted bucket and

wheelpost, the fillets and tangs of said interleaved system of fillets and tangs each being formed

by a combination of curved and straight surfaces", since Webb states that the particular slot and

root form is immaterial and it is clear that Webb relies on locking keys for maintaining the rotor

blades attached to the turbine wheel, these arguments are not persuasive. Webb discloses the

particular angular relationship of the 20.782 degree angle, as set forth above. The fact that Webb

additionally discloses locking keys does not preclude Webb from anticipating the claims. An

interleaved system of fillets and tangs on buckets and wheelposts formed by a combination of

curved and straight surfaces is known to reduce stresses acting along on the buckets and

wheelpost; see Johnson 5,147,180, column 1, lines 45-51, for example.

Concerning argument B2, which is whether claims 29-32 are anticipated under

U.S.C. 102(b) by Johnson 5,147,180, Appellant has argued that the examiner has erroneously

used a single upper tang (one on each side of the bucket) to determine a single point used to

define a line forming an angle of 20.782° with the center line of the bucket, and that if the two

uppermost tangs of Johnson are used, as required by the claim language, to define the line then

the angle formed with the center line is less than 16° in Johnson. Appellant refers to an angle

formed by tangent line TN and centerline PCL in Johnson, figure 1, to be 15.75°. Appellant also

refers to created figure B of Johnson, drawn by Appellant, in Evidence Appendix IX. Appellant

has also argued that the examiner's actions are not in accordance with the claim language which

requires using the two uppermost tangs on each side of a centerline bisecting the bucket, thereby

defining a single specific line that formed an angle of 20.782° with the bucket center line.

These arguments are respectfully disagreed with, because Johnson 5,147,180 still

discloses the claimed subject matter. The straight surfaces of each of the two uppermost tangs

on each side of a center line bisecting each of the buckets each respectively define a point of a

line that forms an angle of 20.782 degrees with the center line on both of these references. The

line drawn from the intersection of the straight surfaces of each of the two upper most tangs may

be selectively drawn such that it intersects the center line (at a portion of the center line remote

from the blade root) and forms the aforementioned 20.782 degree angle, such that this angle is

the same as Appellant's angle E of 20.782 degrees in figure 10, and a point defined by

intersecting tangent lines along pressure faces of the bottom most tang does not lie on either line

that forms the angle of 20.782 degrees with the center line, since the location where the drawn

line that forms the angle E intersects the center line is an arbitrary location. See the annotated

figure for Johnson provided previously above. Claims 10 and 29 do not limit the definition of

the two points to the location at which the straight surfaces intersect, which is what the

specification and figure 10 disclose. Although the claims are interpreted in light of the

specification, limitations from the specification are not read into the claims. See *In re Van

Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Concerning argument C, which is whether claims 10 and 13-19 are rejectable under 35

USC 103(a) as being unpatentable over Webb 3,202,398 in view of By 6,461,110, Appellant has

argued that the examiner has erroneously applied Webb with regard to Webb's teaching of the

20.782° angle for the reasons set above. This argument is disagreed with for the reasons set forth

above. Appellant has argued that By is directed to the profile of airfoil 10 and not to the profile

of dovetail 16, and does not solve the deficiency of Webb, that By does not disclose any

dimensions or angular relationships regarding the configuration of dovetail 16, does not teach or

suggest the required angular relationship of 20.782°, and that the examiner has only cited By for

disclosing first and second stages of a turbine having a wheel with sixty broach slots. These

arguments are correct. With regard to the rejection of claims 18-19 under 35 U.S.C. 103(a) as

being unpatentable over Webb 3,202,398 and By 6,461,110 as applied to claims 14 and 16,

Appellant has argued that the applied case law to *In re Boesch* involved a chemical composition

case in which there were overlapping ranges between the claimed constituents and those

disclosed in the prior art, involved an alleged unexpected result for the concentration of a single

constituent material, and that neither of these factors are present here, and *In re Boesch* is

inapposite. These arguments are not persuasive, because the findings of *In re Boesch* are well-

settled in that discovering an optimum value of a result effective variable involves only routine

skill in the art. With regard to Appellant's argument that claims 18 and 19 recite specific

dimensions for specific structures and do not merely recite ranges, *In re Boesch* has clearly held

that it is well-settled that discovering an <u>optimum value</u> of a result effective variable involves

only routine skill in the art. Applying the case law of *In re Boesch* would allow a person of

ordinary skill in the art to arrive at optimized values. Concerning Appellant's citation of *KSR*

International Co. v. Teleflex Inc., Appellant has argued that under *KSR International Co. v.*

Teleflex Inc., Appellant's invention would not have been obvious, since there were virtually an

infinite number of options for the specific number, angular relationships between, and

dimensions of the tangs and fillets of the buckets and wheelposts, the specific relationships and

dimensions arrived at in these claims, and not a finite number of identified, predictable solutions.

The examiner respectfully disagrees. The rationale applied in rejecting claims 18 and 19 under

35 USC 103(a) is the findings set forth in *In re Boesch*, not *KSR International Co. v. Teleflex Inc.*

KSR is not applied in this rejection.

Concerning argument D, which is whether claim 12 is rejectable under 35 USC 103(a) as

being unpatentable over Webb 3,202,398 and By 6,461,110 as applied to claim 10 above, and

further in view of United Kingdom Patent 677,142, Appellant has argued that Webb does not

teach or suggest the 20.782° angle for the reasons set above. This argument is disagreed with for

the reasons set forth above. Appellant has further argued that United Kingdom Patent 677,142 in

figure 1 indicates that the required angular relationship would only be 15 degrees. It is pointed

out that United Kingdom Patent 677,142 is relied upon to teach a turbine having a rotor with

unnumbered buckets having tangs 3 which are formed at an angle of 55 degrees, and not the

aforesaid 20.782° angle.

Concerning argument E, which is whether claim 12 is unpatentable over Webb 3,202,398

and By 6,461,110 as applied to claim 10 above, and further in view of Caruso 6,030,178,

Appellant has argued that Caruso does not teach anywhere in its disclosure that it is providing

scalloped wheelposts as required by claim 20, that Caruso is concerned with a system that

provides for the final bucket to be radially inserted into the wheelpost thereby allowing

interlocking covers 18 to mate with each other, that there is no mention anywhere in Caruso of

providing scalloped wheelposts to reduce the weight of the wheel, as required by claim 20, and

that the examiner has misinterpreted figure 1 of Caruso as showing scalloped tangs. Appellant

has also argued that figure 1 of Caruso merely shows two protrusions, for example additional

material, and not removed material, on the outer tang of wheel 10 and does not otherwise

describe or even identify these protrusions with a reference numeral anywhere in its

specification. These arguments are disagreed with, because figure 1 of Caruso clearly shows a

turbine wheel 10 having wheelposts shown generally at 12, which are formed such that an

unnumbered outer tang edge of each wheelpost is scalloped, for the inherent purpose of reducing

weight of the turbine wheel. Since the material at the outer tang edge of each wheelpost is not

solid, but has the scalloped indentation, Caruso discloses scalloped tangs, as would be readily

recognized by one of ordinary skill in the art. Concerning Appellant's argument that hindsight

reasoning has been provided by relying on Appellant's specification, it must be recognized that

any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight

reasoning. But so long as it takes into account only knowledge which was within the level of

ordinary skill at the time the claimed invention was made, and does not include knowledge

gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re*

McLaughlin, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The rejection under 35 USC 103(a)

which relies on the teachings of Caruso takes into account only knowledge which was within the

level of ordinary skill at the time the claimed invention was made, and does not include

knowledge gleaned only from the applicant's disclosure, because Caruso teaches that it is known

to use scalloped tangs, which was within the level of ordinary skill at the time the claimed

invention was made.

Concerning argument F, which is whether claim 33 is rejectable under 35 U.S.C. 103(a)

as being unpatentable over Webb 3,202,398, Appellant has argued that examiner asserts that the

specific dimensions given for the bottom tang is a mere "matter of choice in design", that the

applied case law to *In re Boesch* for support of this assertion is improper because *In re Boesch*

involved a chemical composition case in which there were overlapping ranges between the

claimed constituents and those disclosed in the prior art, that *In re Boesch* involved an alleged

unexpected result for the concentration of a single constituent material, that neither of these

factors are present here, and the case law cited by the examiner is inapposite. Appellant has

further argued that claim 33 requires specific dimensions for specific structures, and does not

merely recite range, recites multiple specific dimensions and configurations for multiple

structures from among an infinite number of possibilities for the dimensions and angular

relationships of the specific tangs and fillets and thus does not meet the requirement of a finite

number of identified, predictable solutions as set forth in the Supreme Court's *KSR* decision.

     These arguments are not persuasive, because the findings of *In re Boesch* are well-settled

in that discovering an optimum value of a result effective variable involves only routine skill in

the art. *In re Boesch* has clearly held that it is well-settled that discovering an <u>optimum value</u> of

a result effective variable involves only routine skill in the art. Applying the case law of *In re*

Boesch would allow a person of ordinary skill in the art to arrive at optimized values.

Concerning Appellant's citation of *KSR International Co. v. Teleflex Inc.*, Appellant has argued

that under *KSR International Co. v. Teleflex Inc.,* Appellant's invention would not have been

obvious, since there were virtually an infinite number of options for the specific number, angular

relationships between, and dimensions of the tangs and fillets of the buckets and wheelposts, the

specific relationships and dimensions arrived at in these claims, and not a finite number of

identified, predictable solutions. The examiner respectfully disagrees. The rationale applied in

rejecting claim 33 under 35 USC 103(a) is the findings set forth in *In re Boesch*, not *KSR*

International Co. v. Teleflex Inc. KSR is not applied in this rejection.

Concerning argument G, which is whether claims 34-40 are rejectable as being unpatentable over Webb 3,202,398 in view of Leonardi 4,191,509, Appellant has argued that Webb 3,202,398 does not teach or suggest the required angular relationship of 20.782° between the specifically determined line (using the two uppermost tangs on each side of the bucket) and the centerline in independent claim 10 from which claim 12 depends. This argument is disagreed with for the reasons set forth previously above, namely that Webb discloses this feature. Appellant has further argued that since Leonardi has only been cited for disclosing tangs formed from curved surfaces with more than one radii of curvature, this reference does not solve the deficiency of Webb noted above regarding the required angular relationship of 20.782°. It is agreed that Leonardi does not teach or suggest the aforesaid angular relationship of 20.782°.

Concerning argument H, which is whether claims 41-43 are rejectable under 35 U.S.C. 103(a) as being unpatentable over Pisz 4,824,328 in view of By 6,461,110, Appellant has argued that examiner asserts that the specific dimensions given for the fillets and tangs are mere "matters of choice in design", that the applied case law to *In re Boesch* for support of this assertion is improper because *In re Boesch* involved a chemical composition case in which there were overlapping ranges between the claimed constituents and those disclosed in the prior art, that *In re Boesch* involved an alleged unexpected result for the concentration of a single constituent material, that neither of these factors are present here, and the case law cited by the examiner is inapposite. Appellant has further argued that claims 41-43 require specific dimensions for specific structures, and do not merely recite range, recite multiple specific dimensions and configurations for multiple structures from among an infinite number of

possibilities for the dimensions and angular relationships of the specific tangs and fillets and thus

does not meet the requirement of a finite number of identified, predictable solutions as set forth

in the Supreme Court's *KSR* decision.

These arguments are not persuasive, because the findings of *In re Boesch* are well-settled

in that discovering an optimum value of a result effective variable involves only routine skill in

the art. *In re Boesch* has clearly held that it is well-settled that discovering an <u>optimum value</u> of

a result effective variable involves only routine skill in the art. Applying the case law of *In re*

Boesch would allow a person of ordinary skill in the art to arrive at optimized values for the

tangs and fillets. Concerning Appellant's citation of *KSR International Co. v. Teleflex Inc.*, the

examiner respectfully disagrees that that *KSR* is applied. The rationale applied in rejecting

claims 41-43 under 35 USC 103(a) is the findings set forth in *In re Boesch*, not *KSR*

International Co. v. Teleflex Inc. *KSR* is not applied in this rejection.

Concerning argument I, which is whether claims 44-45, 55-56, and 59-60 are rejectable

under 35 USC 103(a) as being unpatentable over Heinig 5,176,500 in view of By 6,461,110,

Appellant has argued that that examiner improperly asserts that the specific dimensions given for

the fillets and tangs are mere matters of choice in design, that the applied case law to *In re*

Boesch for support of this assertion is improper because *In re Boesch* involved a chemical

composition case in which there were overlapping ranges between the claimed constituents and

those disclosed in the prior art, that *In re Boesch* involved an alleged unexpected result for the

concentration of a single constituent material, that neither of these factors are present here, and

the case law cited by the examiner is inapposite. Appellant has further argued that "obvious to

try" is not applicable here. Appellant has further argued that the claims require specific

dimensions for specific structures, and do not merely recite range, recite multiple specific

dimensions and configurations for multiple structures from among an infinite number of

possibilities for the dimensional relationships of the specific tangs and fillets and thus does not

meet the requirement of a finite number of identified, predictable solutions as set forth in the

Supreme Court's *KSR* decision.

These arguments are not persuasive, because the findings of *In re Boesch* are well-settled

in that discovering an optimum value of a result effective variable involves only routine skill in

the art. *In re Boesch* has clearly held that it is well-settled that discovering an <u>optimum value</u> of

a result effective variable involves only routine skill in the art. Applying the case law of *In re*

Boesch would allow a person of ordinary skill in the art to arrive at optimized values for the

tangs and fillets. Concerning Appellant's citation of *KSR International Co. v. Teleflex Inc.*, the

examiner respectfully disagrees that that *KSR* is applied. The rationale applied in rejecting

claims 44-45, 55-56, and 59-60 under 35 USC 103(a) is the findings set forth in *In re Boesch*, not

KSR International Co. v. Teleflex Inc. KSR is not applied in this rejection.

Concerning argument J, which is whether claims 48 and 49 are rejectable under 35

U.S.C. 103(a) as being unpatentable over Heinig 5,176,500 and By 6,461,110 as applied to

claims 44 and 45, respectively above, and further in view of Phipps 6,893,226, Appellant has

argued that Phipps is only being cited for disclosing 55° for the angle between the upper most

straight portion of the upper most fillet and the upper most straight portion of the upper most

tang instead of the required angle of 50° in claims 48 and 49, that Phipps does not even disclose

the examiner's alleged angle of 55° anywhere in its specification, and that there is not any figure

in Phipps from which an accurate measurement of the angle could be obtained, stating that

figures 1 and 2 of Phipps are perspective drawings and figure 3 of Phipps is a partial drawing

that does not even show the upper fillet and tang from which the required angle could be

measured.

These arguments are disagreed with, because figure 3 of Phipps shows that the turbine

blade 30 has an angle between an upper most straight portion of an upper most fillet 52 and an

upper most straight portion of an upper most tang being 55 degrees, for the purpose of allowing

the blade to withstand centrifugal loading when in operation. Phipps establishes that the angle is

55 degrees (which is close to Appellant's claimed angle of 50 degrees), while the rejection states

that "The specific recitation of this angle being 50 degrees is a matter of choice in design. This

angle is known to be a result-effective variable which adjusts the stress distribution in the blade

roots. It would have been further obvious at the time the invention was made to a person having

ordinary skill in the art to form the modified turbine of Heinig such that this specific angle is 50

degrees, for the purpose of optimizing the stress distribution in the blade roots, since it has been

held that discovering an optimum value of a result effective variable involves only routine skill

in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)."

Concerning argument K, which is whether claims 52-53 are rejectable under 35 U.S.C.

103(a) as being unpatentable over Johnson 5,147,180 in view of By 6,461,110, Appellant has

argued that the examiner has misapplied the art, and that the examiner is asserting bucket

dimensions disclosed in Johnson against broach slot dimensions required by claims 52-53.

This argument is disagreed with, because the tangs and broach slots have complementary and equal dimensions since they are in a mating relationship. With regard to Appellant's arguments that the examiner alleges that compound radii R3 and R4 (equal to each other, but applied from different points taken along a centerline of the tang) for the dimensioning of the upper tang of the bucket, as shown in Figure 1 of Johnson, somehow reads onto the singe radius of curvature required for the fillet recited in claim 52 (i.e., R11 as shown in Fig. 12 and described at paragraph 65 of Appellant's application), and that nowhere does Johnson teach or suggest the single radius of curvature required for the filet in claim 52, these arguments are not agreed with. Claims 52-53 do not recite nor require a "singe radius of curvature" for the fillet in claim 52. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Appellant's argument that By does not overcome the deficiencies of Johnson is agreed with, because By is merely relied upon to a turbine wheel with 60 buckets. Finally, with regard to Appellant's arguments that the dimensions for the tangs and fillets required in these claims are not merely design choices, and that the Examiner's case law citation to *In re Boesch* is inapposite here, for the same reasons given above, and that while *KSR*, as discussed above, holds that a finite number of identified, predictable solutions within the technical grasp of one skilled in the art, "obvious to try" is not the case here, the examiner respectfully disagrees for the reasons set forth previously above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related

Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section **(9)** above.

Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one

of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject

to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the primary

examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other

evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of

rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any

request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set

forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth

in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR

41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any

amendment, affidavit or other evidence, it shall be treated as a request that prosecution be

reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time

period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent

applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination

proceedings.

Respectfully submitted,

/Christopher Verdier/

Primary Examiner, Art Unit 3745

A Technology Center Director or designee must personally approve the new ground(s) of

rejection set forth in section (9) above by signing below:

/KAREN M. YOUNG/

Director, Technology Center 3700

Conferees:

/Edward K. Look/
Supervisory Patent Examiner, Art Unit 3745

/Janet C. Baxter/
TC 3700 TQAS